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AUTHOR Campbell, Martha
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ABSTRACT

According to Benjamin Bloom's (1981) concept of of mastery learning, most students--given the appropriate instruction and learning resources, adequate time spent learning, and perseverance--can learn a particular academic skill. Because a classroom often does not provide enough time or resources for developmental students to master necessary basic skills, the Dekalb (Georgia) Community College South Campus (DCC-S) learning center offers services essential to helping students achieve mastery learning in the areas of English grammar and composition, math, reading, and study skills. The preconditions it has established are that the classroom instructor, learning center staff, and students must comprehend what tasks are to be learned, what procedures are to be followed, and what evaluative instruments are to be used. Among the instructional services it offers are one-to-one tutorials by knowledgeable persons and a variety of resource materials in different instructional modes, including videotapes, audiocassettes, and programed and unprogramed texts. Additional instructional services include minicourses, independent study sections, and individualized class sections. DCC-S also employs frequent evaluative testing and retesting to pace and motivate students. The learning center is also accessible in terms of location and hours to enable students to devote adequate time to their learning. Finally, perseverance by the students is encouraged by the tutors' eagerness to help and by the students being able to repeat tests and show visible progress toward mastery. (CRH)

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Martha Campbell

Instructor, Developmental Studies Division

DeKalb Community College, South

3251 Panthersville Road

Decatur, Georgia 30034

(404) 243-3860

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Mastery Learning in the College Learning Center

A colleague tells entering developmental students each quarter the story of Tom, Dick, and Harriet and their quest for California. Tom, Dick, and Harriet dream of a trip to California; finally, the time for the trip has come. Unfortunately, Tom, Dick, and Harriet do not have the same resources, so they travel to the Golden State by different means. Tom, who has financial difficulties, hitchhikes and finds enough temporary jobs along the way to purchase a car and complete the trip. Dick, fortunate enough to have a good car, travels directly without any car problems. Harriet, independently wealthy, purchases a first-class airline ticket and arrives in hours. Tom, Dick, and Harriet achieve their goal, but the time spent varies because the individual resources are radically different.

This story illustrates vividly Dr. Benjamin Bloom's concept of mastery learning that given the appropriate instruction and learning resources, adequate time spent learning, and perseverance, most students (perhaps as high as 90 percent) can learn a particular academic skill (Bloom, 1981). Because classroom instruction often does not provide enough time or resources for developmental students to master necessary basic skills, an additional place is needed in the college to supplement the learning in the classroom. A college learning center is such a place. At DeKalb Community College, South Campus (DCC-S), the Learning Center, which is part of the Developmental Studies Division and the Learning Resources Center, offers the services essential to helping students achieve mastery in the areas of English grammar and composition, mathematics, reading, and study skills.

Appropriate Instruction

Preconditions. Before the college learning center can assist students in mastering specific skills, the classroom instructor, learning center staff, and students must comprehend what tasks are to be learned, what procedures are to be followed, and what evaluative instruments are to be used to determine when the student has mastered the task. Instructors must clearly outline course objectives so that everyone in the learning process understands what skills students must possess when they have finished the course. Ideally, all instructors in a specific subject area discuss what competencies the student must have at the end of the course and, using this information, divide the course into learning units and design evaluation instruments to test for mastery. For example, at DCC-S, one of the developmental courses is Math 96 - Basic Arithmetic. The math teachers have decided that a student must be able to add, subtract, multiply, and divide whole numbers, fractions, and decimals; must be able to work word problems involving percentages; and must be introduced to the algebraic terminology needed for the next course. Thus the units designed for the course are whole numbers, fractions, decimals, percentages, and introduction to algebra. Students scoring 80 percent or better on the mastery tests prepared for each unit are considered to have mastered the unit. It is difficult for instructors in each subject area to agree on specific course objectives, but, without agreement, a mastery learning program will be hard, if not impossible, to design.

Another precondition for mastery learning is accurate placement testing prior to the student's enrollment in a course along with diagnostic testing during the first few days of class to ensure appropriate placement. For

students to succeed academically, they must be enrolled in a course at the appropriate level. A student who does not know basic arithmetic and is enrolled in an algebra course will experience difficulties. Whether the placement instrument used is an in-house test or a nationally standardized test, it must be appropriate for the course offering. Once the student is placed in a class, additional diagnostic tests should be given to verify placement.

At DCC-S, the Learning Center staff helps to assure that these preconditions are met by encouraging dialogue among subject area instructors, administering placement tests, and helping to assure that students are correctly placed. After the classroom instructors have decided what units the courses will contain, what evaluative measures will be used to check for mastery, and whether students are correctly placed, the Learning Center staff is ready to assist students with a variety of instructional services. The instruction in the DCC-S Learning Center, then, is primarily supplemental to classroom instruction and based on decisions already made by the classroom instructor.

Instructional Services. Essential to mastery learning is the requirement that a student must receive appropriate instruction if mastery of a specific skill is to be accomplished. Instruction in the classroom may not be sufficiently varied since materials are generally limited to the textbook and a variety of handouts. For a variety of reasons, one-to-one instruction is rarely available in the classroom setting, so many college programs employ tutors to direct the student's learning process outside the classroom. Certainly the most important and most often discussed role of the college learning center is the tutorial function. Bloom (1981) states

the importance of tutorial services: "If every student had a very good tutor, most of them would be able to learn a particular subject to a high degree" (p. 160).

The questions, of course, are what qualities "a very good tutor" should possess and how the tutor can help provide the appropriate instruction essential to mastery learning. To be an effective tutor, a tutor must know and be able to communicate to the student what skills the student must master in a course, what steps are involved in learning the skills, and what evaluation measures will be used to determine mastery. The tutor must also be aware of the obstacles which often block learning or extend the amount of time the student must spend learning these specific skills. These obstacles can range from no prior learning related to the task to working forty hours a week while taking a full course load.

Tutorial instruction in the college learning center is generally offered in individual sessions where the tutor most often tries to identify specific problems and attempts to guide the student's learning to remedy the problems. The tutor's task is a difficult one. In the learning center not involved in mastery learning, the tutor often must see the student many times before determining exactly what skills the student has not mastered. For example, the English tutor who reviews a failing paper with a student must often try to determine the student's writing difficulties without seeing the rest of his work in that class and without knowledge of the teacher's requirements. The tutor's lack of knowledge of what is actually required often leads to "hit-and-miss" tutoring. In the learning center of a program which has adopted mastery learning, the instructors of a particular English course have already agreed on the requirements for a passing paper and have made

those requirements known to the student and the tutor. The tutor compares the student's paper with the stated requirements and plans a course of action. The tutor does not have to meet with each instructor and master that instructor's grading system since all instructors use the same grading standards--that is, the instructors have identified for all involved in the learning process the skills which must be mastered.

At DCC-S, the tutoring session in reading, math, and study skills often begins with a review of the unit test given in class. The tutor reviews the class test with the student, identifies any clear pattern of errors on the test, helps the student with corrections, and makes appropriate assignments in the resource materials available in the center. Once the student has completed the assignment and the test has been corrected, the tutor reviews the student's work to determine with the student as much as possible whether the student has sufficiently mastered the necessary tasks so that he can pass a retest (see Retesting).

The advantages of this approach are obvious. From the first meeting the student and tutor can identify what skills need to be learned and what work needs to be done to learn them. The entire encounter is task-directed. The student knows that he will have to retest on the material, and he can plan with the tutor the amount of time he will spend to master these skills.

Another instructional service which is central to mastery learning is the provision of a variety of resource materials in a variety of instructional modes in the learning center. Students should be able to choose from videotapes, audiocassette tapes, and programmed and nonprogrammed texts at different levels of difficulty. In the learning center using the mastery approach, students should be provided study materials related to mastery

units in each of the courses; students can then prepare for unit tests in advance or determine readily what materials are available to prepare for a retest. At DCC-S two math instructors videotaped in the College's Media Center the three developmental math courses: Basic Arithmetic, Beginning Algebra, and Intermediate Algebra. Students who score less then 80 percent on a class unit test can review the lectures on that unit by viewing the appropriate videotapes in the Learning Center. Students who have missed a class or who wish to prepare for a unit test use the videotapes frequently

In addition to tutoring and resource materials, the college learning center should offer additional instructional services. One such service is support for special courses offered in the developmental program. At DCC-S the Learning Center promotes mini-courses, independent study sections, and individualized class sections. The Learning Center has offered mini-courses between fall and winter quarters and summer and fall quarters. These courses in English, reading, and math are reserved for students who have previously taken the course but have failed to achieve mastery on all units. Students may register for only one course which requires more time daily in the classroom than during a regular quarter but for a shorter number of weeks. For example, during the December mini-quarter, students attend class for an average of five hours a day for nine days as opposed to an average of fifty minutes a day for ten-and-a-half weeks. Students are required to complete mastery only on those units not completed the previous quarter. Independent study sections in math are offered each quarter for those students who completed at least three of the five required units the previous quarter. Students register for one-quarter hour for each unit not completed previously In addition, individualized class sections in math are offered each quarter

for students who prefer to work independently rather than attend a traditional lecture class. Students can move through the required units at their own pace and may complete the course prior to the end of the quarter and begin work in the following course within that same quarter. As a support system, the Learning Center maintains student records on units mastered the previous quarter and provides tutors to assist students in these special sections.

Competency verification is a further instructional service which a college learning center can offer to a program using the mastery approach. At DCC-S many students who take the math placement test score at the Math 96 Basic Arithmetic level. For the student who wishes to challenge the placement and who has not yet begun the math sequence, the Learning Center offers a competency test over basic arithmetic. The student takes a practice test, reviews the practice test with a tutor, works with a tutor on problem areas, and takes the competency test. If the student does well on this test, he can enroll in the next required math course.

A variety of instructional services is essential for mastery learning to take place. The college learning center is the ideal place for such services to be offered since the classroom teacher's resources are often limited. Success depends on the learning center staff's being able to determine which instructional services best serve the student's needs.

Retesting for Mastery. Frequent evaluative tesing is a mark of the developmental program using the mastery learning approach. According to Bloom (1981), "Frequent formative evaluation tests pace the learning of students and help motivate them to put forth the necessary effort at the appropriate time" (p. 169). For many developmental students the class test is only the first step toward achieving mastery. Mastery frequently is not accomplished until the student retests on the specific unit.

In the traditional classroom, students who fail to achieve mastery on a particular skill simply move to the next class unit. Unfortunately, the information in the second unit frequently builds on skills supposedly learned in the previous unit. The student with weak skills, therefore, often meets with a succession of failures.

In the mastery approach students who do not pass the unit test given in the classroom are allowed to retest until mastery is achieved. Since retesting individuals on various levels is difficult in the classroom, a college learning center should offer a testing center where retesting for mastery can take place. The testing center should meet several requirements: a test monitor should be present to administer the tests; the test monitor and the instructor must establish a clear system for locating retests and grading the tests; and, above all, the monitor must maintain appropriate testing conditions.

At DCC-S the testing center is located in the Learning Center. Before the student can retest on a class unit, the tutor or the instructor must verify that the class test has been corrected and that the student has completed and reviewed any assignments made by the tutor or instructor. The retest is taken in the testing center and returned to the instructor or tutor for grading. If the student does not achieve 80 percent or better on the test (80 percent being "mastery"), the process begins again. While retesting, the student continues to attend class. In math the class units are sequential, and students cannot take the next class unit test until they have achieved mastery on the first unit. In English, reading, and study skills, the units are generally not sequential, and students can move to the next unit test but must complete all units with 80 percent before passing the course.

The retests at DCC-S come from a test bank which the instructors in the subject area maintain. Since the class test also comes from the bank, the student and instructor know that the retest will have types of questions similar to, though not identical to, the class tests. Instructors add tests to the bank as often as possible so that an adequate number of test forms is always available.

Retesting for mastery is crucial when a developmental studies program adopts the precepts of mastery learning. Retests are both diagnostic instruments for students who have yet to master required skills and achievement tests for students who have learned these skills and are ready to test on the next unit. The learning center environment is appropriate for the individual retesting that must be done somewhere other than the classroom.

Adequate Time

Another of the precepts of mastery learning states that, in addition to appropriate instruction, the student must spend the time he needs to master the assigned task. Since developmental students typically have so many tasks to master, this precept is often in conflict with the quarter or semester system typical of college developmental studies programs. Holding class for a certain number of minutes for a particular number of weeks often provides inadequate time for developmental students to achieve the course objectives, given the wide range of abilities and academic backgrounds. Thus, the instructor often must supplement classroom work with out-of-class assignments structured to ensure the student's spending enough time on task to learn the assigned skill.

If mastery is to be achieved, students must spend enough time on the learning task in an environment both accessible and conducive to learning.

An appropriate learning environment can, in fact, shorten the time necessary to learn a skill. Bloom (1981) states: ". . . It is highly probable that more effective learning conditions can reduce the amount of time required to learn a subject to mastery for all students and especially for the students with lower aptitudes" (p. 159).

The college learning center can offer students additional hours of work in this kind of environment. The importance of accessibility cannot be emphasized too greatly. At DCC-S the Learning Center has the same hours as the Learning Resources Center where it is located. These hours (67 per week) allow ample flexibility for the typical community college student who must often balance his academic responsibilities with the responsibilities of his family and his job. Trained staff must be available to the student during peak hours. During most of the day hours, the Learning Center at DCC-S is staffed with tutors in the areas of math, reading, English, and study skills. During the evening hours, a math assistant and reading and/or English assistant are also present. Budgetary restrictions may not provide for this much staffing; however, if the learning center is located in the learning resources center, at least the instructional materials will be available for students to work independently.

A developmental studies program which has adopted the mastery approach requires a learning environment outside the classroom. Particularly for the community college student, too many distractions await him outside the doors of the college. Accessibility of location, flexibility of hours, and staff ready to help are essential if the student is to have enough time to master required skills in an appropriate environment on campus.

Perseverance

Not only are appropriate instruction and adequate time necessary if mastery learning is to take place, but the student must also possess perseverance (Carroll, 1963). The student must decide whether it is worth the time and instruction required if he is to learn a particular skill. If he does decide that the skill is worth the effort, then he must continue to work until mastery has been achieved. The college learning center can encourage perseverance in many ways.

The tutor's presence in the learning center helps the student to persevere by reducing anxiety about his classroom performance. In the mastery approach a test is not a "one-shot deal." The student knows that he will have other chances to improve his score. Since the tutor is often the first person to talk with the student after he receives the class test from his instructor, the tutor must show the student that success on retests can be achieved when the student and tutor determine the areas of difficulty and the student takes the time to complete the instruction necessary to learn the required skills.

The tutor's response to the student having difficulty is critical if the student is to persevere until the learning task is mastered. The tutor must communicate his confidence in the student's ability to learn, and the student must be willing to respond to the tutor's eagerness to help. One way the tutor can provide encouragement is by urging the student to ask questions when they arise rather than waiting until his next class session. A way to encourage frequent questions is to ask the student who is using resource materials to show his work at frequent, specified intervals. The tutor can then spot any problems before the student becomes mired in material

too difficult for him. As a result, the student is more confident because his work has been thoroughly and frequently checked. Sometimes the student is surprised to find that some questions are too easy for him, and he is ready to be directed to some other part of the assignment. Once the student has completed any assignments, the tutor can provide further encouragement by reviewing the material orally with the student. At that point the tutor must carefully evaluate whether the student is ready to retest because if the the student retests and is not successful, then he may no longer desire to continue working. The tutor can both boost confidence and assess the student's chances to retest successfully by asking the student to retake for practice a mastery test which he has previously failed. Many times the student will realize after completing the "practice test" that he has mastered the required skills. The encouragement of the tutor combined with the improved confidence and newly acquired skills of the student frequently enable the student to achieve the 80 percent mark on the retest.

This successful retesting promotes further perseverance by the student. According to Bloom (1981), "For those students who have thoroughly mastered the unit, the . . . tests should reinforce the learning and assure the student that his present mode of learning and approach to study is adequate. Since he will have a number of such tests, the student who consistently demonstrates mastery should be able to reduce his anxiety about his course achievement" (p. 170).

In the end, the student decides whether he will persevere long enough to learn the basic skills he lacks. Many other factors, of course, influence his decision. Nevertheless, the college learning center dedicated to mastery learning can make a difference.

Program Evaluation

For most administrators the eventual measures of whether a developmental studies program utilizing Bloom's mastery learning theories is successful are whether students master the skills in a specific course and are assigned a grade of C or better and whether students remain in the program more than one quarter. Developmental programs need to examine carefully how much difference using the mastery approach makes in enabling students to meet their learning goals. One measurement is a comparison of the overall passing rates of developmental courses before and after a mastery learning program is placed into operation. Many other factors, of course, can influence the number of students passing a course in a particular quarter, but such a comparison can be useful. Table 1 compares the 1978-79 and 1979-80 academic years at DCC-S. During the 1978-79 school year, the mastery learning approach was not in effect. The year 1979-80 marked the first year that mastery learning concepts were used consistently in developmental classrooms. Another measurement is an examination of retention rates. Table 2 shows how many students who entered the program in 1979-80 remained in Fall 1980.

Conclusion

With an ever increasing variety of educational backgrounds and intellectual abilities, Tom, Dick, and Harriet continue to enter developmental studies programs. In an effort to meet the challenge of such a diverse group of students, developmental programs search for educational philosophies and methods that will meet students' needs. A program such as the one at DCC-S which adopts Bloom's concept of learning for mastery can provide these students with direction by identifying for all involved in the learning process the specific skills which must be learned and determining how the skills will be taught and measured. The program must then provide support

services including a comprehensive learning center so that additional instructional resources and increased time for learning will be available to students outside the classroom. Although Tom, Dick, and Harriet must assume the final responsibility for reaching or failing to reach California, competent developmental studies programs dedicated to meeting students' needs can at least help keep Tom, Dick, and Harriet travelling in the right direction. As Robert Louis Stevenson said in "El Dorado," "To travel hopefully is a better thing than to arrive."

References

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Table 1

Percentage of Students Receiving C or Above in Developmental Courses Before and After Adoption of Mastery Learning Approach

Fall 1978-Spr 1979			Fall 1979-Fall 1980		
Course	%Passing	#Enrolled	Course	%Passing	#Enrolled
Eng 98	41%	385	Eng 98	46%	584
Eng 99	43%	279	Eng 99	47%	449
Rdg 98	51%	303	Rdg 98	61%	490
Rdg 99	49%	174	Rdg 99	65%	330
Mth 96	44%	96	Mth 96	46%	329
Mth 97	33%	278	Mth 97	53%	310

Table 2

Retention of Students
Entering Developmental Studies Program
in 1979-80 and Remaining Fall 1980

	# Entering Program	# Remaining Fall 80	% Remaining
Fall 1979	155	106	68%
Winter 1980	72	51	71%
Spring 1980	69	46	67%
Summer 1980	41	32	78%